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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup>:

B65D 75/58, 75/56, B67D 5/02, 1/04

A1

(11) International Publication Number:

WO 97/33809

(43) International Publication Date: 18 September 1997 (18.09.97)

(21) International Application Number: PCT/NL97/00096

(22) International Filing Date: 28 February 1997 (28.02.97)

(30) Priority Data:

1002505

1 March 1996 (01.03.96)

NL

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B.V., P.O. Box 3241, NL-2280 GE Rijswijk (NL).(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR,  
BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE,  
GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ,  
PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT,  
UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS,  
MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ,  
MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI  
patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE,  
SN, TD, TG).

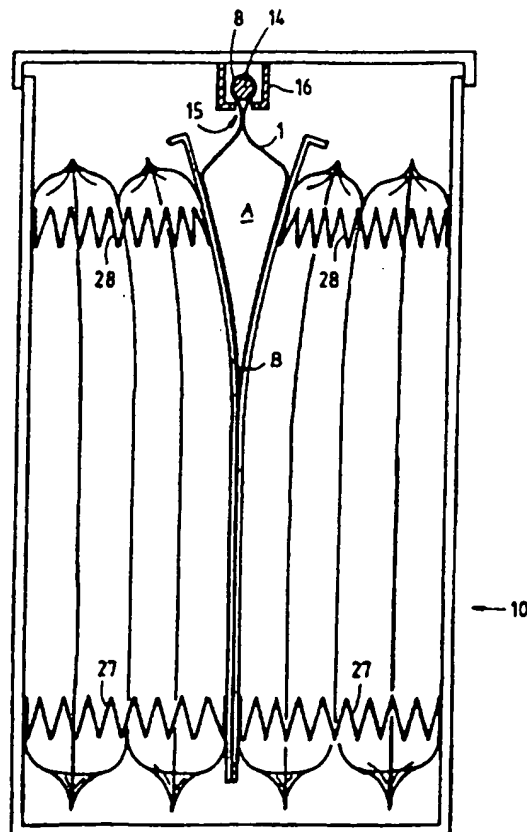
## Published

*With international search report.**Before the expiration of the time limit for amending the  
claims and to be republished in the event of the receipt of  
amendments.**In English translation (filed in Dutch).*

(54) Title: A DISPENSING DEVICE FOR DISPENSING A FLUID SUBSTANCE FROM A BAG

## (57) Abstract

Dispensing device (10) for dispensing a fluid substance, such as sauce (for chips), cream, soap and the like, from a bag, a storage part of which is filled with the substance to be dispensed, which bag (1) can be placed in the dispensing device and has a dispensing opening (9) for the substance, the dispensing device (10) having two plates (25, 26) which are disposed next to one another, between which plates (25, 26) at least the storage part of the bag can be placed, at least one of the plates being movable in the direction of the other plate, and actuator means being provided for displacing the movable plate in order to assist the supply of substance to the dispensing opening (9) by compressing the bag (1), means furthermore being provided which ensure that the plates (25, 26) delimit between them a substantially wedge-shaped space (A) when the bag is compressed, which wedge-shaped space has a vertex (B) on the side remote from the dispensing opening and becomes wider in the direction of the dispensing opening. At least one of the plates (25, 26) is of flexible design. Furthermore, the dispensing device is designed such that, when the bag is compressed, the vertex (B) of the wedge-shaped space (A) moves gradually in the direction of the dispensing opening, from that side of the bag (1) which is situated away from the dispensing opening.



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A dispensing device for dispensing a fluid substance from a bag

The present invention relates to a dispensing device in accordance with the preamble of claim 1.

A dispensing device of this kind is known, for example, from EP-0 278 773. In this known dispensing  
5 device, the bag is held at its top side and the dispensing opening of the bag is situated on the underside. When the bag is compressed, springs ensure that the movable plate comes to stand at a downwardly opening angle with respect to the stationary plate. Since the two plates are of rigid  
10 and non-deformable design, as the bag is emptied the movable plate hinges about its top edge with respect to the stationary plate. Therefore, as the bag is compressed, the two plates enclose a wedge-shaped space with flat, straight sides, the wedge angle of the wedge-shaped space becoming  
15 gradually smaller as the bag is emptied. During emptying of the bag, the vertex of this wedge-shaped space remains in position at the top of the bag.

The known device is designed to empty in one go small and flat bags which contain one portion of a certain  
20 substance. If the structure with plates described in EP-0 278 773 is designed for considerably larger bags, which have a storage part in which many portions of the substance are situated, dispensing the substance from the bag has proved to be a problem. Emptying the bag by means of the  
25 known device causes particular problems if the dispensing opening of the bag is situated on the top side, instead of on the underside as in the known device.

The object of the invention is to eliminate the abovementioned problems. Furthermore, an object of the  
30 invention is to provide a dispensing device which empties the bag as well as possible, does not come into contact with the substance to be dispensed and as a result does not have to be cleaned, or has to be cleaned only rarely, ensures a good quality of the substance dispensed, is  
35 simple to use, is of simple construction and is not

susceptible to faults. A further object of the invention is to provide a dispensing device which is suitable for dispensing a substance from a bag, in particular from a bag which has a dispensing opening on the top side, in  
5 accurately metered portions.

In order to achieve the abovementioned objects, the present invention provides a device in accordance with the preamble of claim 1 which is characterized in that at least one of the plates is flexible and in that the dispensing  
10 device is designed such that, when the bag is compressed, the vertex of the wedge-shaped space moves gradually in the direction towards the dispensing opening, from that side of the bag which is situated away from the dispensing opening.

When emptying the bag using the dispensing device  
15 according to the invention, it can be seen that the plates first empty the bag on the side situated away from the dispensing opening and then empty the bag completely over a continuously increasing area. The bag can be emptied virtually completely using the dispensing device according  
20 to the invention; tests have shown that more than 99 per cent of the substance can be dispensed from the bag.

A preferred embodiment of the dispensing device according to the invention has substantially vertically disposed plates and is designed to dispense the substance  
25 from a bag having a storage part for holding a plurality of portions of the substance and having a dispensing opening for dispensing the substance at the top side of the bag.

This preferred embodiment has the advantage, inter alia, that the vertical height of the dispensing device can  
30 be smaller than in the case of dispensing devices which are intended for bags with a dispensing opening on the underside. Particularly when the filled, full bag is heavy, a smaller height of the dispensing device facilitates placing the bag therein. Also, for example when the  
35 dispensing device is to be arranged on a counter, a lower design of the said dispensing device forms less of an obstacle between the customers and the staff behind the counter.

In an advantageous embodiment, the at least one movable plate is displaced by means of an actuator operated by a pressure medium. This is advantageous since the pressing action exerted on the bag by an actuator of this kind, which is operated for example by means of compressed air or pressurized liquid, can be controlled simply and accurately. The actuator may be a piston-cylinder assembly, but may also, for example, be an inflatable body which can be inflated in a simple manner using compressed air.

Preferably, pressure-detection means are provided in order to detect the pressure of the substance in the bag resulting from the displacement of the plates, in particular in the vicinity of the dispensing opening of the bag. Preferably, furthermore, control means are provided which control the action of the actuator means as a function of the pressure of the substance detected by the pressure-detection means. By detecting the pressure in the region of the dispensing opening of the bag and providing a suitable design of the control means, it is possible to maintain the pressure of the substance at a more or less constant value, even if the bag is becoming continuously more empty. This control also results in a virtually constant delivery of the substance during dispensing until the bag is completely empty.

Further advantageous embodiments of the present invention are described in the claims and in the following description with reference to the drawing, in which:

Fig. 1 shows a perspective view of a preferred embodiment of the bag according to the invention,

Fig. 2 shows a diagrammatic, perspective view, partially cut away, of an exemplary embodiment of the dispensing device according to the invention, in which the bag in accordance with Fig. 1 is suspended,

Fig. 3 shows a front view of the dispensing device of Fig. 2 when the bag is virtually empty,

Fig. 4 shows a diagrammatic representation of the detection and control means of the dispensing device of Fig. 2,

Fig. 5 shows a diagrammatic representation of an

exemplary embodiment of the closure means of the dispensing device according to the invention, and

Fig. 6 shows a representation of the part in accordance with Figure 5 of another exemplary embodiment of the dispensing device according to the invention.

The bag 1 shown in Figure 1 is intended to be filled with a substance, for example 5 litres of sauce for chips, and then to be hermetically sealed, so that the bag 1 can be transported and stored without problems. In order to dispense the substance from the bag 1, the bag 1 should be suspended at its top side in a suitably designed dispensing device.

The bag 1 has a storage part 2 which forms virtually the entire useful volume of the bag 1. The storage part 2 is substantially rectangular in the embodiment shown, with a top and bottom edge which are parallel to one another and two parallel side edges. In another embodiment (not shown), the side edges would taper downwards towards one another, so that the storage part is slightly triangular.

A part of the bag 1 which forms a dispensing channel 3 of the bag is connected to one of the side edges of the storage part 2, in the region of the top edge of the storage part 2. The dispensing channel 3 has a first channel part 4, one end of which is connected to the storage part 2 and which projects laterally from that side edge of the storage part 2. A second channel part 5, which is directed substantially downwards, is connected to the other end of the first channel part 4. The second channel part 5 is hermetically sealed at the bottom end, at 6.

At the top side of the storage part 2 and preferably also above the part which forms the dispensing channel 3, the bag 1 is provided with suspension provisions 8, by means of which the bag 1 can be suspended in a dispensing device. As can be seen in Figure 1, the suspension provisions 8 preferably comprise a sleeve which is open at both ends and extends over the top side of the bag 1. This sleeve 8 may be used to receive a suspension rod which can be fastened to the dispensing device or, as a

fixed component, forms part of the dispensing device.

In order to create a dispensing opening for the substance, it is envisaged to remove the closed end part of that part of the bag 1 which forms the second channel part 5, for example at the position of the dashed line in Figure 1. This can be done, for example, by severing or cutting. For this reason, the bag 1 is intended to be disposable. By filling the bag 1 with the substance in a suitable manner, it can be ensured that air is situated in the bottom part of the second channel part 5 of the filled bag 1, so that there is no mess when the bag 1 is opened there and substance cannot pass immediately to the outside.

In the suspended state of the bag 1, the dispensing opening 9 of the bag 1 is situated above the level of most of the storage part 2 of the bag 1. The dispensing device should thus be able to force the substance upwards towards the dispensing opening 9 of the bag 1. The second channel part 5 ensures that the flow of the substance is directed substantially downwards, so that the object onto or into which the substance is to be dispensed, for example a tray of fried chips, can be held beneath the dispensing opening 9 of the bag 1.

The above-described arrangement of the dispensing channel 3 and the dispensing opening 9 of the bag 1 is regarded as a separate invention. This bag 1 can be placed in a vertical position in a dispensing device, which needs to be considerably less high than dispensing devices which accommodate a known suspendible bag with a dispensing opening on the underside. A suitable dispensing device of this kind may optionally be designed differently from the dispensing device according to the present invention, embodiments of which will be explained below with reference to Figures 2-6.

Preferably, the whole of the bag 1 is made of plastic film of a suitable quality. In particular, the bag 1 is made of a plastic film which does not stretch noticeably under the effect of the pressure produced in the substance by means of a dispensing device. The seams of the bag 1 can be made by conventional welding methods.



Preferably, as can be seen in Figure 1, the sleeve 8 is also made of the same film material as the rest of the bag 1.

Preferably, the passage of the second channel part 5 is adapted to the desired form of the flow of substance emerging from the dispensing opening 9. Furthermore, it is advantageous if the first channel part 4 has a larger passage than the second channel part 5, in order to keep the flow resistance of the substance through the dispensing channel 3 low.

The bag 1 is suitable for a very wide variety of substances which can be described as "fluid", that is to say both for free-flowing substances and for more viscous or pasty substances. The substances may be foodstuffs, for example sauces (for chips), margarines, but also substances such as, for example, cream, soap, glue, paint, etc. The substances do not have to have a homogeneous composition and may also contain small particles, as are often found, for example, in edible sauces.

By adapting the passage of the second channel part 5 of the bag 1 to the viscosity of the substance, that is to say making it smaller the more fluid the substance is, it is in principle possible to use one and the same dispensing device for dispensing different substances.

It will be clear that, instead of the form bent at right angles shown in Figure 1, the dispensing channel 3 may, for example, be curved or the first channel part may be directed obliquely downwards from the storage part.

Figure 2 shows an exemplary embodiment of the dispensing device 10 according to the invention with the bag 1 which has been described in detail with reference to Figure 1 suspended therein.

As can also be seen from Figure 2, the bag 1 has a suspension loop 8 running over its entire top edge. In order to suspend the bag 1 in the housing of the dispensing device 10, a separate suspension rod 14 is first inserted into the suspension loop 8 of the bag 1. The bag 1 is then held in front of the front side, which is then open, of the dispensing device 10 and the suspension rod 14, with the

bag 1 hanging from it, is slid into a support rail 16 provided with a longitudinal slot 15 (see Fig. 3) of the dispensing device 10, until the bag 1 is hanging in the correct position.

5       The dispensing opening 9 of the suspended bag 1 is situated on the front side of the dispensing device 10 and in the region of the top side of the bag 1.

10       In order to close the dispensing opening 9 when no substance is to be dispensed from the bag 1, the dispensing device 10 is provided with a controllable closure provision 17, which can pinch tight the second channel part 5 of the bag 1 at a, preferably small, distance above the dispensing opening 9 of the bag 1. In the example shown, the closure provision 17 comprises a stationary, possibly resiliently  
15       disposed, plate 18 on one side of the second channel part 5 of the bag 1 and a closure member 20, which can pivot about an axis 19, on the other side of the bag 1. By pivoting the closure member 20 using preferably electrically controlled means (not shown in more detail) the flow of the substance  
20       out of the dispensing opening 9 of the bag 1 can be released or interrupted.

      It is clear that the substance is dispensed directly from the bag 1 and does not come into contact with the dispensing device 10. A very important advantage of  
25       this is that the substance cannot be contaminated by dirt on the dispensing device 10 and that the device 10 does not have to be cleaned, or has to be cleaned only seldom.

      In order to ensure the supply of the substance from the storage part 2 of the bag 1, substantially against the  
30       force of gravity, to the dispensing channel 3 of the bag 1, the dispensing device 10 shown comprises two pairs of inflatable plastic bellows 20, 21 and 22, 23. Each pair of bellows 20, 21 and 22, 23 rests against an associated vertical side wall of the housing of the device 10. A  
35       substantially vertically disposed plate, 25 and 26 respectively, is present on the other side of each pair of bellows. The two plates 25 and 26 are disposed movably with respect to the housing of the dispensing device 10, so that they can be displaced at least towards one another and away

from one another.

In order to be able to empty the bag 1 as far as possible, the plates 25 and 26 have dimensions such that at least the storage part 2 of the bag 1 lies completely

5 between the two plates 25 and 26. If desired, additional means may be provided for emptying the dispensing channel 3 of the bag 1.

It should be noted that as soon as the plates 25, 26 clamp the bag between them, the suspension rod 14 no  
10 longer bears the weight of the bag 1.

Compressed air is fed to the bellows 20-23 for the purpose of moving the plates 25, 26 towards one another, in order to force the substance out of the bag 1. To this end, an air compressor 30 is provided, which in this example is  
15 electrically driven and is connected via a tube 31 to the bellows 20-23. In this example, the air compressor 30 is of a type which can only effect a slight excess pressure, for example 0.2 bar, so that a pressure relief valve is not required for safety purposes. The air compressor 30 may  
20 also be a hand pump. A manually controllable air relief valve 32 is provided for the purpose of allowing the air to flow out of the bellows 20-23, in order to be able to place a full bag in the device 10 or to be able to remove an empty bag.

25 A small excess pressure of the air fed to the bellows 20-23 is safe and can be used, inter alia, due to the fact that the bellows 20-23 bear against the associated plate 25 and 26, respectively, over virtually the entire surface, so that despite the low pressure in the bellows  
30 20-23 a considerable total compressive force can nevertheless be exerted on the bag 1.

The plates 25 and 26 are not fastened to the bellows 20-23, but are fastened to the vertical side walls of the housing of the dispensing device 10 via tension  
35 springs 27, 28, which act on the lower and upper parts of the plates 25, 26, respectively. For the sake of clarity, the springs 27, 28 are omitted in Figure 2. The springs 27, 28 are indicated only diagrammatically in Figure 3; in a practical embodiment, the springs 27, 28 are leaf springs

which at one end are fixedly fastened to the side walls of the housing and at the other end project through slots in the plates.

The springs 27, 28 are designed to hold the plates 5 25, 26 away from one another, that is to say they counteract the expansion of the bellows 20-23. As a result, the springs 27, 28 act, on the one hand, as return means which, when the bellows 20-23 are decompressed, seek to move the plates 25, 26 away from one another, so that an 10 empty bag can be removed and a new, full bag can be placed in the dispensing device 10.

The springs 27, which act on the underside of the plates 25, 26, preferably have a significantly lower resistance to extension than the springs 28, which act on 15 the topside of the plates 25, 26. The difference in return force of the springs 27, 28 means that the plates 25, 26 seek to stand at an upwardly opening wedge angle with respect to one another. In combination with a suitable flexibility of the plates 25, 26, that is to say if the 20 plates 25, 26 are not so rigid that they do not bend when the bag 1 is compressed during normal use of the dispensing device, an effect is achieved such that the bag 1 is completely emptied in a lower part thereof and is then held pressed flat and, above this, they enclose the wedge-shaped 25 space A shown in Figure 3. As the bag 1 is emptied further, the downwardly pointing "vertex" B of the wedge-shaped space A between the plates 25, 26 moves gradually upwards, as a result of which all the substance has been forced out of the bag 1 beneath this "vertex" B, which can be 30 described as a kind of "rolling-out action" which the plates 25, 26 exert on the bag 1. This progressive displacement of the point B, at which the plates 25, 26 are first pressed towards one another to the maximum extent, from the bottom upwards ensures that the bag 1 is emptied 35 extremely well. Tests have shown that it is possible, using the dispensing device 10 shown, to empty the storage part 2 of the bag 1 until only one per cent of the original volume remains.

In an embodiment which is suitable in practice, the

plates 25, 26 are made from stainless steel with a thickness of a few millimetres.

Furthermore, this manner of compressing the bag 1 is easy on the plastic material of the bag 1, due to the absence of a movement of the plates 25, 26 with respect to the bag 1 and due to the fact that the load is distributed evenly over the side walls of the bag.

Furthermore, the present invention provides for compensation means to be present which allow the plates 25, 26 to carry out a compensatory displacement. As a result of the compression of the relatively thick bag 1, the dimensions of the bag 1 become greater, viewed in the direction perpendicular to the direction of compression, as the bag 1 becomes emptier. For this reason, in the dispensing device 10 shown, free space is present around the plates 25, 26 for the outwardly moving edge regions of the bag 1. However, the bag 1 is held more or less fixedly with respect to the housing of the device at the level of the closure provision 17. Displacement of the storage part of the bag 1 with respect to that part of the bag 1 which is held in a stationary manner with respect to the housing may give rise to the formation of folds in the intermediate part of the bag 1, as a result of which the bag can become closed in certain areas. In the dispensing device 10 shown, as the bag 1 is emptied, the top part thereof will move upwards. In order to prevent this, the compensation means here effect a downwardly directed compensatory displacement of the storage part of the bag 1. This takes place here due to the fact that the springs 27, 28 are designed such that the plates 25, 26 not only move towards one another but then also move gradually downwards.

In order to assist the formation of the wedge-shaped space A between the plates 25, 26, it may be envisaged to provide these plates 25, 26 with a certain curvature beforehand.

In order to ensure that the dispensing device 10 is always immediately ready to dispense the substance, the pressure in the bellows 20-23 is maintained as long as the bag 1 has not been completely emptied. As a result, the

substance in the bag 1 remains continuously under a slight pressure.

In accordance with a further aspect of the invention, it is envisaged to provide pressure-detection means 40 in order to detect the pressure resulting from the action of the bellows 20-23 and the springs 27, 28 of the substance in the bag 1. In this case, the pressure-detection means 40 are designed to detect the pressure of the substance in the vicinity of the dispensing opening 9 of the bag 1, in particular the pressure of the substance in the first channel part 4 of the bag 1.

In the example which is depicted diagrammatically in Figure 2 and shown in more detail in Figure 4, the pressure-detection means 40 comprise a body 41 which bears via a preloaded spring 42 against the outside of the first channel part 4 of the bag 1. The position of the body 41 is determined by means of an electrical proximity sensor 43, which is arranged in a stationary manner with respect to the housing of the dispensing device 10.

In a variant which is not shown of the pressure-detection means, the body 41 is arranged in a recess in one of the two plates 25, 26, where it bears with preloading against the outside of the bag. In this case, a proximity sensor measures the position of the body 41 with respect to the plate 25, 26 in question.

As mentioned earlier, the bellows 20-23 remain continuously pressurized as long as the bag 1 is not completely empty.

In order to dispense the substance, the dispensing opening 9 of the bag 1 is now released with the aid of the closure provision 17. As a result, substance flows out of the dispensing channel 3 of the bag 1, as a result of which the substance provides less resistance to the depression of the bag 1 by means of the body 41, which can then move to the position indicated by a dashed line in Figure 4. This displacement is detected by the sensor 43, which as a result controls a relay 44, as a result of which the air compressor 30 is switched on. When the pressure of the substance in the dispensing channel 3 has risen again, and

the body 41 has returned to its initial position, the sensor 43 switches the air compressor 30 off again.

The above-described simple control means that the pressure of the substance in the dispensing channel 3 of the bag 1 can be maintained at a virtually constant level, whether the bag 1 is completely full or virtually empty. This control automatically compensates for a change in the flow resistance of the substance as the bag becomes emptier and as a result of a change in the viscosity depending on the temperature.

In a variant which is not shown, the bag according to the invention may be provided with an outwardly bulging chamber, which is preferably directly connected to the dispensing channel of the bag. If the pressure-detection means are now allowed to act on this bulging chamber, the pressure of the substance in the dispensing channel is again detected. However, the body 41 is prevented from impeding the flow of the substance by depressing the dispensing channel.

In another variant which is not shown of the pressure detection, the bag, or at least a part of the bag, may be made of a material which can be stretched elastically under the influence of the pressure of the substance, in particular a plastic film, and means may be provided in order to measure the stretching of that part of the bag or a parameter which is a function thereof. The stretching of the bag can be determined directly by providing means which determine the change in the distance between two points of the bag. However, it is also possible to provide means which detect the expansion or contraction of the elastic bag when the pressure of the substance in the bag changes, which expansion or contraction is directly related to the stretching of the material of the bag.

Figure 5 shows another embodiment of the closure provision for the dispensing opening 9 of the bag 1. In the case of this closure provision 50, a plate 51, which is disposed in a stationary and optionally resilient manner, is situated on one side of the second channel part 5. Two independently controllable closure members 52 and 53 are

present opposite the plate 51, on the other side of the bag 1. The closure members 52 and 53 are pivotable about a common pivot pin 54 of the dispensing device. Like the closure member 20 in Figure 2, the lower closure member 52 extends over the entire width of the second channel part 5 of the bag 1 and, as a result, can completely release or close the dispensing opening 9. By contrast, the upper closure member 53 extends only over part of the width of the second channel part 5 of the bag 1. If only the lower closure member 52 is now pivoted away from the plate 51 and the bag 1 remains clamped between the upper closure member 53 and the plate 51, then only part, for example half, of the dispensing opening 9 is released, and a narrower flow emerges from the dispensing opening 9. By providing the upper closure member 53 with a suitably large width, the flow is prevented from widening again after passing the narrowed section formed by the said closure member 53.

Using the dispensing device 10 described, the substance can be dispensed in small portions, but it is also possible to dispense an uninterrupted flow of the substance for a long period of time.

In a variant, shown in Figure 6, of the device according to the invention, the dispensing device is provided with controllable first closure means 60, which can close off the bag 1 close to the dispensing opening 9 of the bag 1, and controllable second closure means 70, which can pinch the bag 1 tight at a location, preferably at the dispensing channel 3, such that a closed chamber is formed in the bag 1 between the first closure means 60 and the second closure means 70. By way of example, the first and the second closure means 60, 70 are designed as two pinching members 61, 62 and 71, 72 which can be moved towards one another and away from one another. Furthermore, this variant of the dispensing device according to the invention is provided with pressing means 80 which can exert a pressure on that part of the bag 1 which is situated between the first closure means 60 and the second closure means 70, in order in this way to dispense a portion of the substance from the bag 1 while the second



closure means 70 hold the bag 1 closed and the first closure means 60 are open. Preferably, the pressure-exerting means are designed so as to be adjustable, so that an adjustable amount of the substance can be pressed out of this part of the bag 1, so that a portion with an accurately defined volume can be dispensed from the bag 1. These pressure-exerting means may, for example, as is shown diagrammatically in Figure 6, comprise two small movable plates 81, 82. These two plates 81, 82 are sufficiently large for the entire part of the dispensing channel 3 which is situated between the first and the second closure means 60, 70 to be situated between the plates 81, 82. Associated controllable second actuator means (not shown) are provided in order to move these plates 81, 82 towards one another, in order in this way to dispense the substance from the dispensing opening 9 of the bag 1. After dispensing a portion of the substance, the first closure means 60 close the dispensing opening 9 of the bag 1 again and the second closure means 70 open, the plates 81, 82 resuming their position in which substance can flow from the storage part of the bag 1 into the completely or partially emptied part of the bag 1. Preferably, the minimum distance between the plates 81, 82 can be adjusted, so that as a result the size of the portion to be dispensed can be adjusted.

Using the dispensing device 10 shown, the substance can be dispensed in small portions, but it is also possible to dispense an uninterrupted flow of the substance for a long period of time.

In another variant which is not shown of the dispensing device according to the invention, the housing comprises a base and substantially closed side walls, and an opening for placing the bag between the plates is situated on the top side. Preferably, the opening on the top side of the dispensing device can be closed off using a lid. Furthermore, there may be provision for the first closure means and the optionally present second closure means to be arranged on the lid. The pump 30 may also be incorporated in the lid.

Furthermore, it can also be seen from Figure 6 that

the bag 1 is provided, at the location of the dispensing channel 3, for example in the region of the underside thereof, as is shown, with an engagement provision, here designed as opening 85, for a positioning member, here  
5 designed as pin 86, arranged on the dispensing device.

In a following variant of the dispensing device, a counter may be provided which counts the number of portions dispensed of the substance. The dispensing device may also be designed as a coin-operated vending machine for self-  
10 service.

It will be clear that, in the context of the present invention, the term bag is also understood to mean a container which is to some extent dimensionally stable but which can easily be compressed between plates in order  
15 to dispense substance from the container.

In order to dispense certain substances, it may be envisaged to design the plates 25, 26 as heating bodies which can heat the substance in the bag 1. Naturally, it is also possible to design the plates 25, 26 as cooling  
20 bodies.

It will be clear that the dispensing device according to the invention can also be realized in embodiments which are suitable for accommodating a bag in a position other than the position hanging vertically  
25 downwards, for example with a bag lying horizontally, or for accommodating a bag with the dispensing opening in the region of the underside of the bag.

Furthermore, it will be clear that the measure of providing pressure-detection means for detecting the  
30 pressure, resulting from the action of the supply-assisting means, of the substance in the bag in the vicinity of the dispensing opening of the bag can be used in combination with any dispensing device for dispensing a fluid substance from a bag, the storage part of which is filled with the  
35 substance to be dispensed, which bag can be placed in the dispensing device and has a dispensing opening for the substance, the device having supply-assisting means in order to assist the supply of the substance to the dispensing opening.

# CLAIMS

1.       Dispensing device (10) for dispensing a fluid substance, such as sauce (for chips), cream, soap and the like, from a bag (1) which has a storage part, which is filled with the substance to be dispensed, and a dispensing opening (9) for the substance, the dispensing device (10) comprising a housing in which are accommodated two plates (25, 26) which are disposed next to one another, between which plates (25, 26) at least the storage part of the bag (1) can be placed, at least one of the plates being movable in the direction of the other plate, and actuator means (20-23, 30) being provided for displacing each movable plate in order to assist the supply of substance to the dispensing opening (9) by compressing the bag (1), the plates (25, 26) delimiting between them a substantially wedge-shaped space (A) when the bag is compressed, which wedge-shaped space (A) has a vertex (B) on the side remote from the dispensing opening and becomes wider in the direction of the dispensing opening, characterized in that at least one of the plates (25, 26) is flexible and in that the dispensing device is designed such that, when the bag is compressed, the vertex (B) of the wedge-shaped space (A) moves gradually in the direction towards the dispensing opening, from that side of the bag (1) which is situated away from the dispensing opening.

2.       Dispensing device according to claim 1, both plates (25, 26) being movable and an associated actuator (20-23) being provided for each of the plates.

3.       Dispensing device according to claim 1 or 2, the dispensing device comprising return means (27, 28) which seek to hold the plates (25, 26) away from one another.

4.       Dispensing device according to one of more of the preceding claims, means (27, 28) being provided which ensure that a greater force is required to move the plates, on the side situated in the region of the dispensing opening of the bag, towards one another than on that side of the bag which is situated away from the dispensing opening.

5.       Dispensing device according to claim 4, return means holding the at least one plate on the side of the dispensing opening of the bag away from the other plate with a greater force than on the side situated away from the dispensing opening.
6.       Dispensing device according to one or more of the preceding claims, compensation means being provided which carry out compensatory displacements of the bag (1) situated between the plates (25, 26) with respect to the housing of the dispensing device, which compensatory displacements form a compensation for the displacements of parts of the bag (1) which result from the change in the shape of the bag (1) when the latter is compressed.
7.       Dispensing device according to one or more of the preceding claims, the actuator means for each movable plate comprising an inflatable body (20-23), which is disposed between the plate in question and the housing of the dispensing device, as well as pump means (30) for feeding a pressure medium to the inflatable body.
8.       Dispensing device according to claim 7, the inflatable body (20-23) acting on the associated plate (25, 26) over substantially the entire surface of the latter.
9.       Dispensing device according to one or more of the preceding claims, controllable first closure means (17; 50; 60) being provided so as to open or close the dispensing opening (9) of the bag (1) selectively.
10.      Dispensing device according to claim 10, controllable second closure means (70) being provided at a distance from the first closure means (60), and the dispensing device being provided, between the first closure means (60) and the second closure means (70) with means (80) exerting a pressure, in order to exert a pressure on that part of the bag (1) which lies between the first and the second closure means, in order to dispense the substance present in that part of the bag when the first closure means (60) are open and the second closure means (70) are closed.
11.      Dispensing device according to claim 10, the means (80) exerting a pressure being designed to dispense

virtually completely all of the substance present in the relevant part of the bag.

12. Dispensing device according to claim 10 or 11, the means (80) exerting a pressure being of adjustable design, in order to adjust the size of the portion to be dispensed of the substance.

13. Dispensing device according to claim 9, the first closure means (50) being provided with adjustment means for adjusting the size of the passage of the dispensing opening (9) of the bag (1).

14. Dispensing device according to one or more of the preceding claims, pressure-detection means (40) being provided in order to detect the pressure of the substance in the bag, which pressure results from the compression of the bag.

15. Dispensing device according to claim 14, the pressure-detection means (40) being designed to detect the pressure of the substance in the vicinity of the dispensing opening (9) of the bag.

16. Dispensing device according to claim 14 or 15, the pressure-detection means (40) comprising a body (41) which bears with preloading against the bag, as well as means (43) for detecting the position of the body (41).

17. Dispensing device according to one of claims 14-16, control means (44) being provided which control the action of the actuator means (20-23, 30) as a function of the pressure of the substance detected by the pressure-detection means (40).

18. Dispensing device according to claim 17, the control means being designed to control the actuator exclusively as a function of the pressure of the substance detected by the pressure-detection means.

19. Dispensing device according to one or more of the preceding claims, the plates (25, 26) being substantially vertical.

20. Dispensing device according to claim 19, suspension means (14, 15, 16) being provided in order to suspend the bag (1) between the plates (25, 26).

21. System for dispensing fluid substance filled in

bags, comprising a combination of a dispensing device according to one or more of the preceding claims and a compressible bag intended to be placed in the said dispensing device.

5 22. System for dispensing fluid substance filled in bags, comprising a combination of a dispensing device according to claim 20 and a compressible bag which is provided on its top side with suspension means (8) for suspending the bag in the dispensing device.

10 23. System according to claim 22, the bag (1) having a dispensing channel (3) which is connected to the storage part (2) in the region of the top side of the said bag and has a first channel part (4), which extends substantially laterally from the storage part (2), and a second channel  
15 part (5), which is connected to the first channel part (4), is directed substantially downwards, and is closed off at its bottom end (6), the dispensing opening (9) of the bag being formed by opening the second channel part.

24. System according to claim 23, the second channel  
20 part (5) of the bag having a narrower passage than the first channel part (4) of the dispensing channel (3).

25. System according to claim 23 or 24, the suspension means (8) of the bag (1) also being present above that part of the bag which forms the dispensing channel (3).

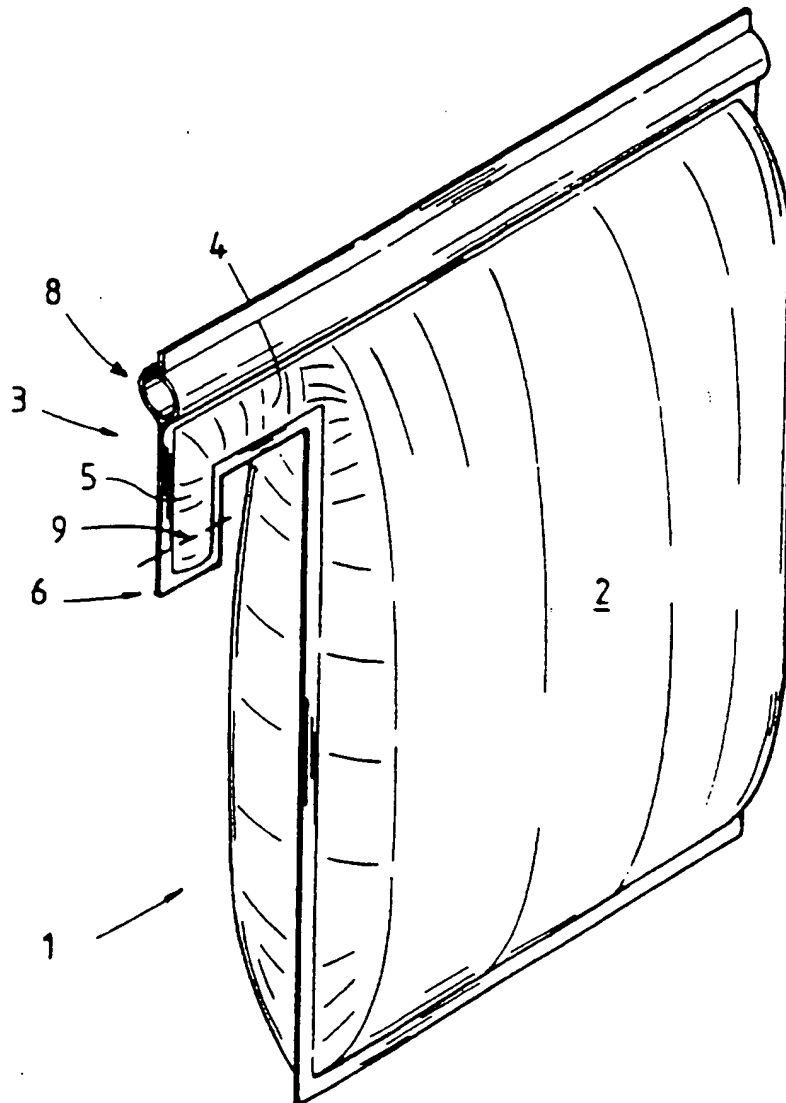


FIG. 1

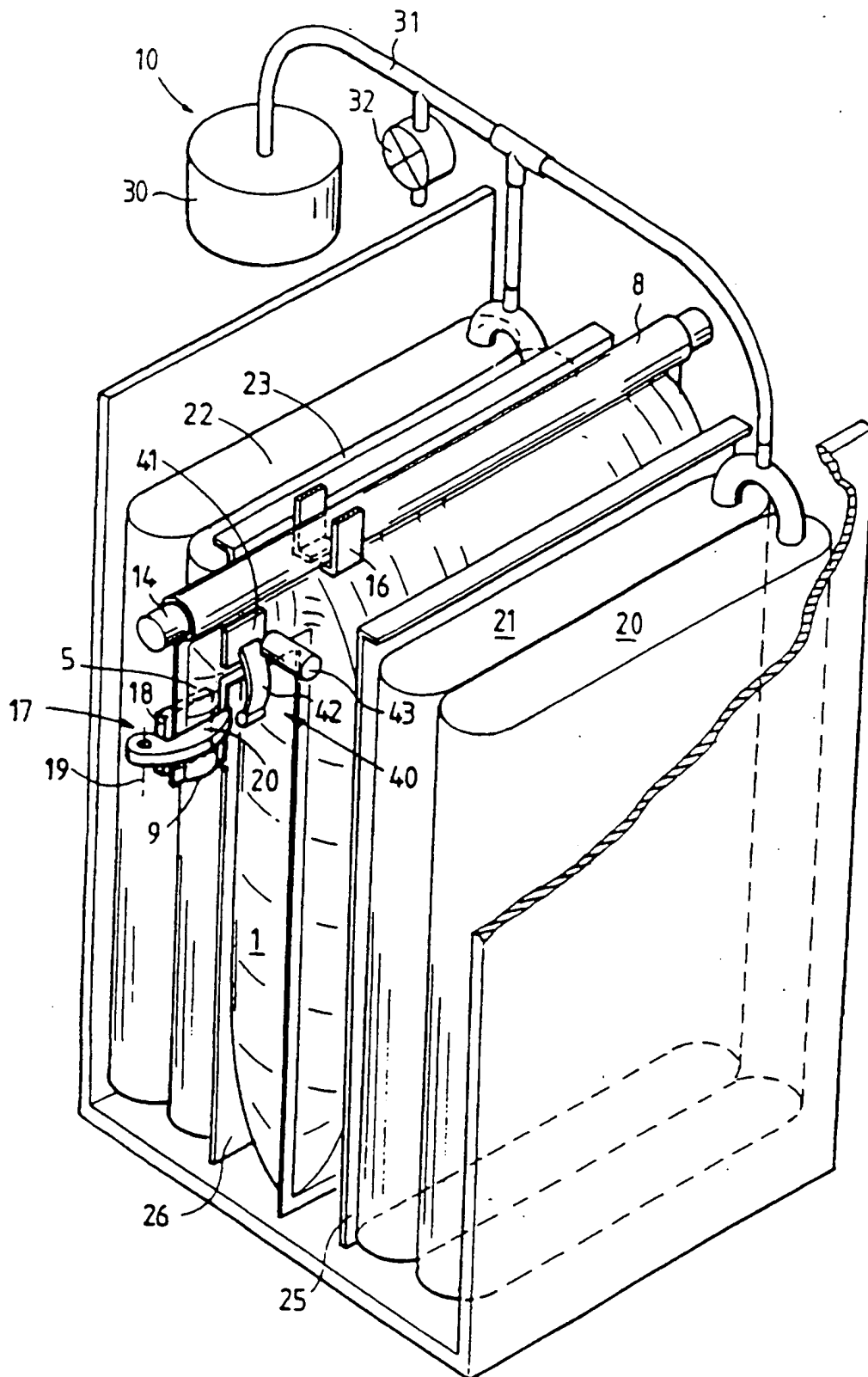


FIG. 2



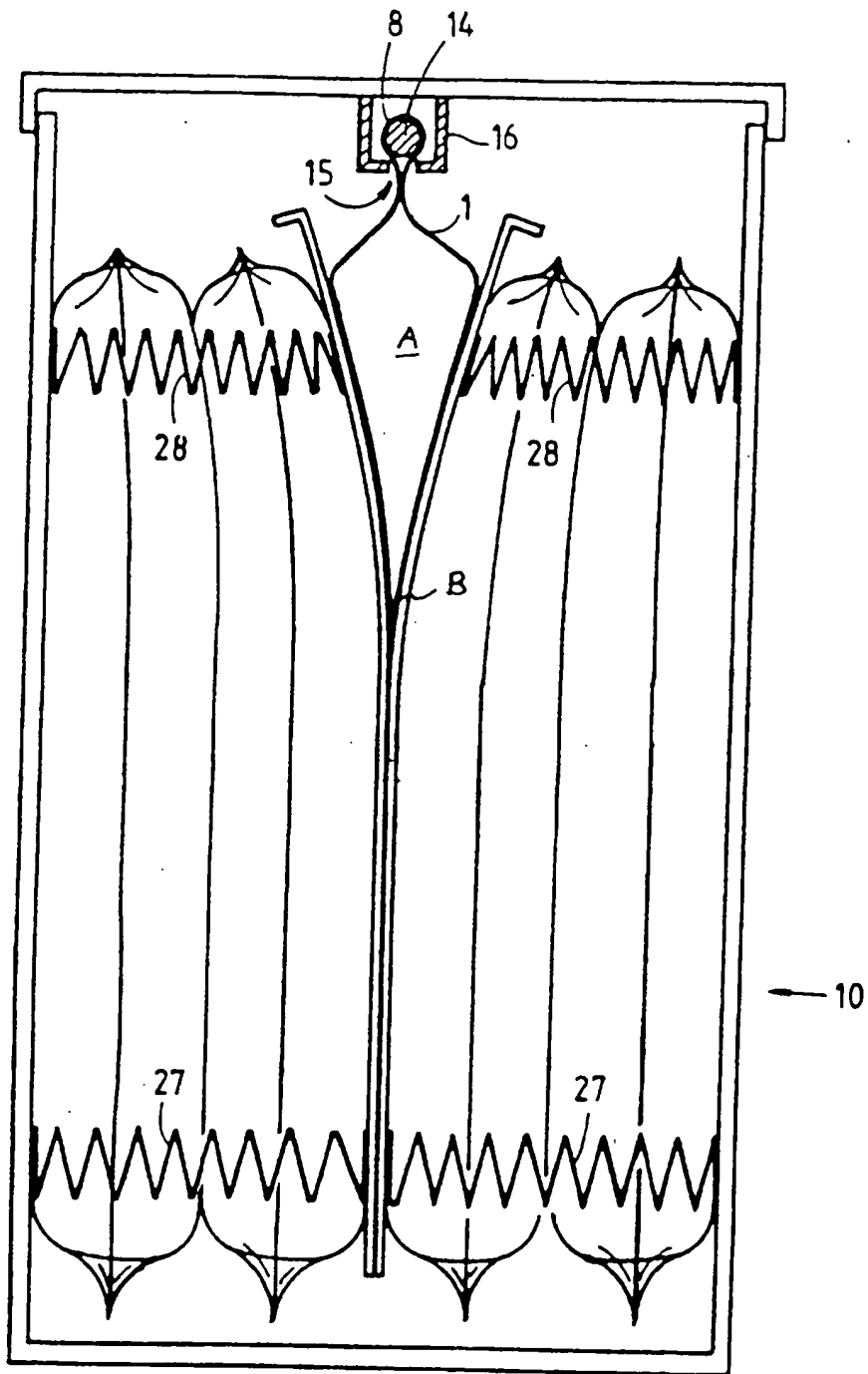


FIG. 3

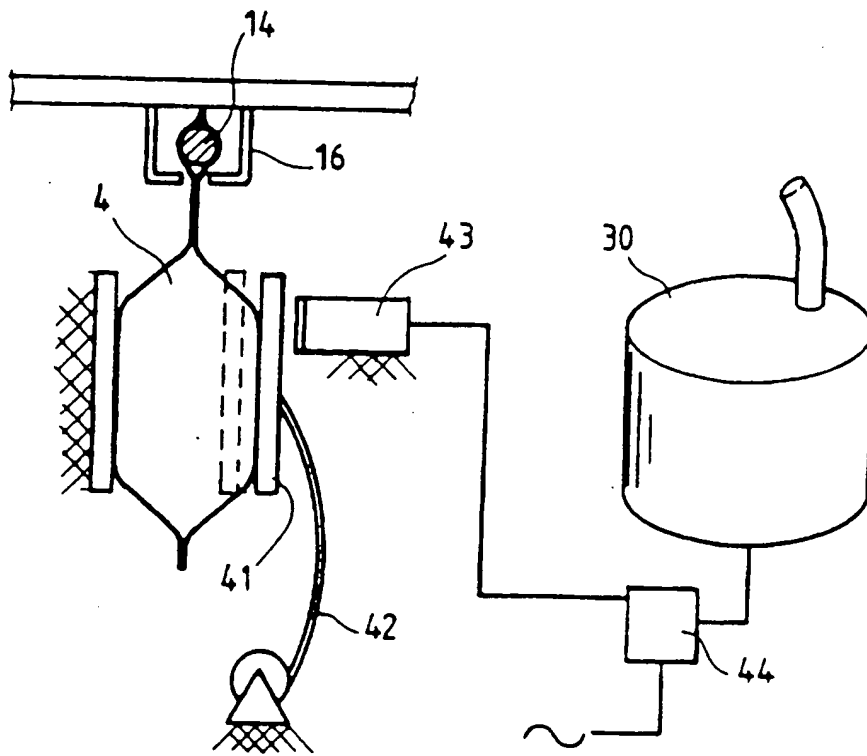


FIG. 4

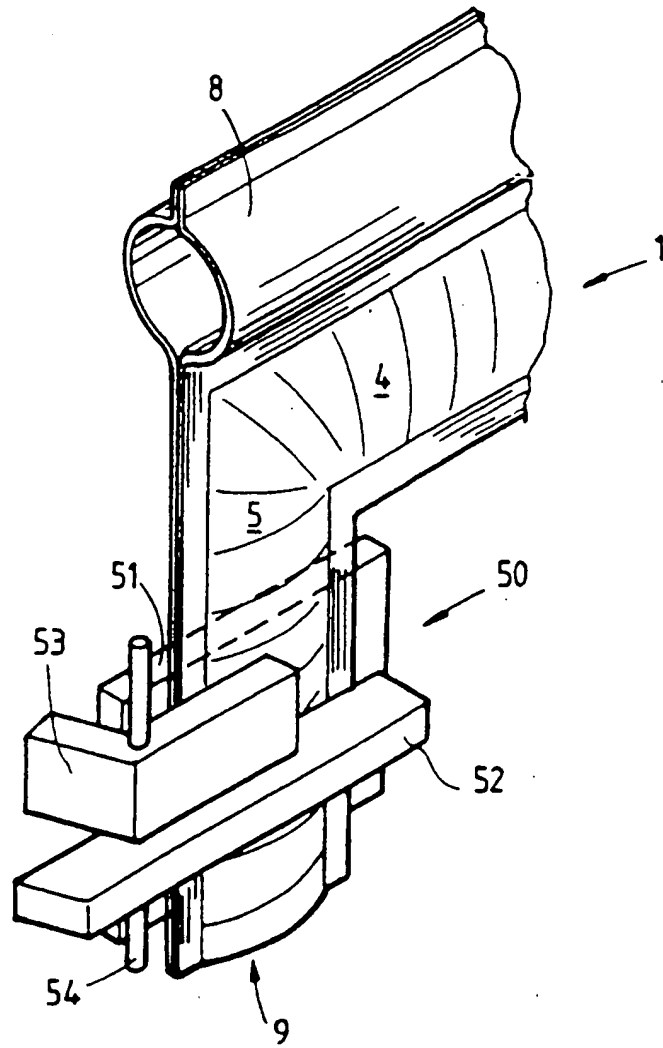
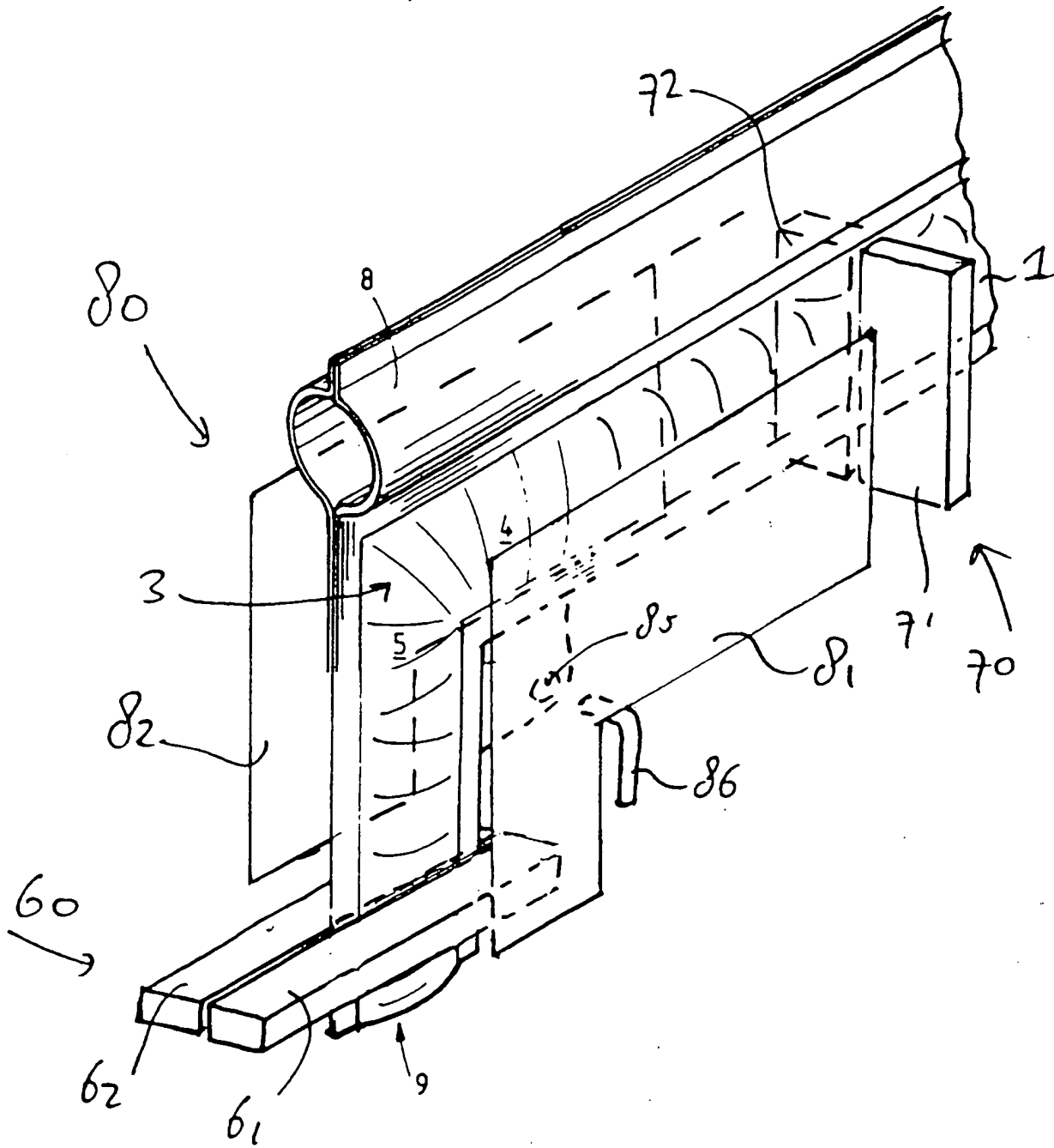


FIG. 5



A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B65D75/58 B65D75/56 B67D5/02 B67D1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D B67D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 278 773 A (STRENGER) 17 August 1988 cited in the application see column 4, line 48 - column 5, line 63 see column 6, line 58 - column 7, line 32 see figures 4,5	1
A	EP 0 002 987 A (SOC. GEN. POUR L'EMBALLAGE) 11 July 1979 see page 3, line 32 - page 4, line 18; figures	1
A	GB 2 137 962 A (GENERAL FOODS) 17 October 1984 see page 2, line 50 - line 79 see figures 1,2	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

1 July 1997

Date of mailing of the international search report

07.07.97

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